भारतीय मानक
Indian Standard

IS 4217 : 2020

रोलिंग बीयरिंग — नीडल रोलर्स — विनिर्देश

(दूसरा पुनरीक्षण)

Rolling Bearings — Needle Rollers — Specification

(Second Revision)

ICS 21.100.20

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भारतीय मानक ब्यूरो
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September 2020 **Price Group 3**

Bearings Sectional Committee, PGD 13

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft is finalized by Bearings Sectional Committee had been approved by the Production and General Engineering Division Council (PGDC).

This Indian Standard was first published in 1967 and subsequently revised in 1981. This revision has been taken up to incorporate feedback gained through experience and other developments taken at international level in this field.

Needle rollers are used as rolling element in needle bearings of nominal diameter up to 6 mm and the ratio of the nominal length to the nominal diameter is in the range of 3 to 10.

The subjects of needle cages, needle bearing and their various assemblies have been covered in separate specifications.

In this revision, the following changes have been made:

a) Clause on references has been modified;
b) Clause on terminology has been added;
c) Clause on basic design, dimensions and weights has been added;
d) Clause on material has been modified;
e) Clause on hardness has been modified;
f) Clause on designation system has been modified; and
g) Figures 1 and 2 have been modified.

In the preparation of this standard assistance has been derived from DIN 5402-3 : 1993 ‘Rolling Bearings — Rolling Bearing Components — Needle rollers’ issued by the Deutsches Institut Fur Normung (DIN) and ISO 3096 : 2018 ‘Rolling bearings — Needle rollers — Boundary dimensions, geometrical product specifications (GPS) and tolerance values’.

The composition of the Committee responsible for the formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*).’ The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

ROLLING BEARINGS — NEEDLE ROLLERS — SPECIFICATION

(Second Revision)

1 SCOPE

This Indian Standard specifies the requirements such as material, dimensional and geometrical characteristics, designation, manufacture, finish and packaging for needle rollers.

2 REFERENCES

The standards given below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standard indicated below:

IS No.	*Title*
1501 (Part 1) : 2013	Metallic materials — Vickers hardness test: Part 1 Test method (*fourth revision*)
1586 (Part 1) : 2018	Metallic materials — Rockwell hardness test: Part 1 Test method (*fifth revision*)
2399 : 2019	Rolling bearings — Vocabulary (*second revision*)
3073 : 1967	Assessment of surface roughness
4398 : 1994	Carbon — Chromium steel for the manufacture of balls, rollers and bearing races — Specification (*second revision*)
4905 : 2015	Random sampling and randomization procedures (*first revision*)
16736 : 2020	Rolling bearings — Needle rollers — Boundary dimensions, geometrical product specifications (GPS) and tolerance values (*first revision*)
17111 : 2019	Heat-treated steels, alloy steels and free-cutting steels — Ball and roller bearing steels

3 TERMINOLOGY

For the purpose of this standard the definitions given in IS 16736 : 2020 shall apply.

4 SYMBOLS

For the purpose of this standard the symbols given in IS 16736 : 2020 shall apply.

5 DIMENSIONS

For the purpose of this standard the dimensions given in IS 16736 : 2020 shall apply.

6 TOLERANCES

For the purpose of this standard the tolerances given in IS 16736 : 2020 shall apply.

7 MATERIAL

The material for the needle rollers shall be in accordance with IS 4398 or IS 17111.

8 HARDNESS

Needle roller's hardness at the core shall be 58 to 65 HRC or 670 to 840 HV when determined in accordance with IS 1586 (Part 1) or IS 1501 (Part 1) as applicable.

9 DESIGNATION

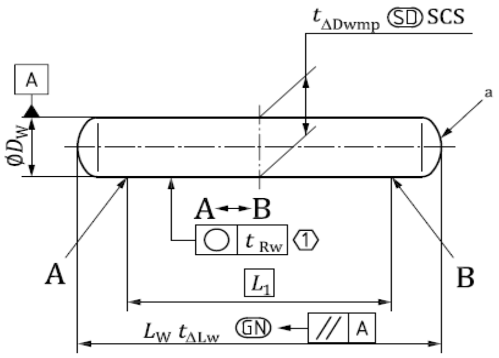
9.1 Shape of Ends

The shape of ends of the needle rollers shall be as shown in Fig. 1 and Fig. 2. The specifications for the radial chamfer r_{1s} and axial chamfer r_{2s} shall be as given in IS 16736 : 2020.

9.1.1 *Form A — For needle rollers with rounded ends*

9.1.2 *Form B — For Needle Rollers with Flat Ends*

9.2 The needle rollers conforming to this standard shall be designated by the Name, the number of this standard, design (form), nominal diameter (Dw), nominal length (Lw), Grade and tolerance group.

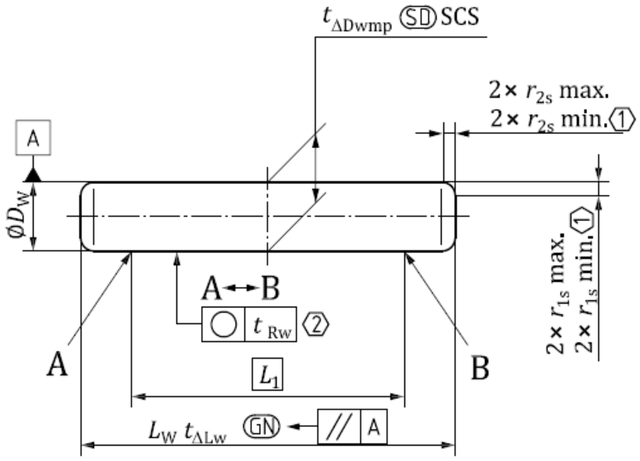


Key

① Length of measuring zone L_1 (A<->B) has to be agreed between manufacturer and customer.

[a] Needle roller end profile which may not necessarily be a true radius but shall fall within the limits of $D_\mathrm{w}/2$ and $L_\mathrm{w}/2$.

FIG. 1 NEEDLE ROLLER WITH ROUNDED ENDS



Key

① No material is allowed to project beyond an imaginary circular arc, which has a radius r_{1s} min. or r_{2s} min. in an axial plane and is tangential to the needle roller diameter outside surface and the needle roller side face.

② Length of measuring zone L_1 (A <-> B) has to be agreed between manufacturer and customer.

FIG. 2 NEEDLE ROLLER WITH FLAT ENDS

Example:

For needle roller of Form B, Nominal Dia 3 mm, Nominal Length 11.8 mm, Grade G2 and diameter tolerance -2, -4 :

Needle roller IS 4217 — B3 × 11.8 G2 (–2 –4)

10 MANUFACTURE

10.1 The needle rollers shall be free from cracks, flaws, rust and other injurious defects.

10.2 Needle rollers should be designed with slightly sloping lateral surfaces towards the sides. In this way tension at the edges could be avoided.

11 FINISH

The surface roughness of the rolling surface of the needle rollers shall be ≤ N3 when determined in accordance with IS 3073.

12 SAMPLING AND TESTING

Unless and otherwise agreed between the manufacturer and the purchaser, the sampling and testing procedures as given in Annex A shall be followed.

13 PRESERVATION, PACKING AND MARKING

13.1 The needle rollers shall be protected from rust and suitably packed. The packets shall be marked with the size of the needle rollers, grade, and tolerance groups and manufacturer's symbol or trade-mark.

13.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

ANNEX A

(*Clause* 12)

SAMPLING AND TESTING

A-1 LOT

In any consignment, all the needle rollers of the same designation and manufactured under similar conditions of production shall be grouped to constitute a lot.

A-2 SAMPLING

The number of needle rollers to be selected at random from each lot for inspection shall be as per Table 1. To ensure randomness of selection, methods for random sampling as given in IS 4905 shall be followed.

A-3 INSPECTION

A-3.1 The random samples selected as in **A-2**, Table 1 (Col 2), shall be inspected for dimensional tolerances, workmanship and protection against corrosion as per requirements in this specification. Any needle roller failing to meet the requirement for any one or more of the above characteristics shall be declared as defective.

A-3.2 The random sub-sample selected as in Table 1 (Col 4), shall be inspected for form tolerance and hardness. Any needle roller failing to meet the requirement for any one or more of the above characteristics shall be declared as defective.

A-4 CONFORMITY

The lot shall be considered conforming to the requirement, if the number of defectives is less than or equal to the corresponding acceptance number in Table 1 (Col 3) and (Col 5).

Table 1 Sampling Plan and Criteria for Conformity

(*Clause* A-2, A-3.1, A-3.2 *and* A-4)

Lot Size	Sample Size	Acceptance Number	Sub-sample Size	Sub-acceptance Number
(1)	(2)	(3)	(4)	(5)
Up to 10000	32	2	5	0
10001 to 35000	50	3	5	0
35001 to 150000	80	5	8	1
150001 to 500000	200	10	13	1
500001 and above	315	14	20	2

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Bearings Sectional Committee, PGD 13

Organization	*Representative(s)*
Centre for Engineering and Technology (CET), SAIL Ranchi	Shri Virendra Kumar (***Chairman***)
Bajaj auto Ltd Akurdi, Pune	Shri D. D. Pawar Shri S. D. Gupta (*Alternate*)
Bharat Heavy Electricals Limited, Hyderabad	Shri Manish Agrawal Shri U. Sridhar (*Alternate*)
Bimetal Bearing Limited, Coimbatore	Shri R. S. Mani Shri Raveendra (*Alternate*)
Controllerate of Quality Assurance (Vehicles), DGQA, Ahmednagar	Representative
Defence Metallurgical Research Laboratory, Bengaluru	Shri Satyapal Singh Dr Manish Roy (*Alternate*)
Directorate of Standardization, New Delhi	Representative
Escorts Limited, Faridabad	Representative
GKN Sinter Metals Private Limited, Pune	Shri Dayasagar Mrig
Hindustan Aeronautics Limited, Bengaluru	Shri T. H. Gonsalves Dr C. H. Kannababu (*Alternate*)
ILJIN Bearings Co Limited, Pune	Shri Dharmendra Parmar
Kanpur Metal Products, Kanpur	Shri N. C. Vaish Shri Gaurav Vaish (*Alternate*)
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National Aerospace Laboratories, Bengaluru	Shri Soumendu Jana
Research, Designs & Standards Organization, Lucknow	Shri Vijay Kumar Goel
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BIS Directorate General	Shri Deepak Kumar Jain, Scientist 'F' and Head (PGD) [Representing Director General (*Ex-officio*)]

Member Secretary

Shri Kundan Giri
Scientist 'C' (PGD), BIS

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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